

1/2 010 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--EFFECT OF AN EXTERNAL ELECTRIC FIELD ON QUADRUPOLE SPIN ECHO -U-
AUTHOR--AYNBINDER, N.YE., SVETLOV, YU.G. A
COUNTRY OF INFO--USSR
SOURCE--PIS'MA ZH. EKSP. TEOR. FIZ. 1970, 11(1), 15-18
DATE PUBLISHED-----70
SUBJECT AREAS--CHEMISTRY, PHYSICS
TOPIC TAGS--ELECTRIC FIELD EFFECT, CHLORINE, CHLORINATED ORGANIC COMPOUND,
BENZENE DERIVATIVE, NUCLEAR RESONANCE
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1984/1264 STEP NO--UR/0386/70/011/001/0015/0018
CIRC ACCESSION NO--AP0055935
UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0055935

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF AN EXTERNAL ELEC. FIELD ON THE QUADRUPOLE SPIN ECHO OF PR6ME35 CL IN POLYCRYST. CCL SUB4, CHCL SUB3, C SUB2 CL SUB6, C SUB2 H SUB4 CL SUB2, PHCL, AND CL SUB2 AT 77DEGREESK WAS STUDIED. THE VALUES OF THE SHIFTS OF THE NUCLEAR QUADRUPOLE RESONANCE (NQR) FREQUENCY OF PRIME35 CL CAUSED BY THE EXTERNAL ELEC. FIELD AND THE COMPONENTS OF THE ELEC. FIELD TENSOR EFFECT (3RD ORDER) AGREED WELL WITH THOSE ESTD. BY USING THE STATIONARY METHOD. THE SPIN ECHO METHOD ALLOWS THE MEASUREMENT OF THE FREQUENCY SHIFTS IN THE CASE OF WEAK ELEC. FIELDS; THERE IS NO NEED TO KNOW TH ABS. NQR FREQUENCY.

UNCLASSIFIED

USSR

UDC 621.383.292

AYNBUND, M. R., GUSAKOVA, N. G., KOZHINSKAYA, E. V., SEMENOVA, V. B.

"Production Technology and Linearity of the Characteristics of Miniature Channel Emitters"

Elektron. tekhnika. Nauchno-tekhn. sb. Elektronoluch. i fotoelektr. pribory (Electronic Technology. Scientific-Technical Collection. Electron Beam and Photoelectric Devices), 1970, Issue 2(16), pp 11-15 (from RZh--Elektronika i yeye primeneniye, No 5, May 1971, Abstract No 5A194)

Translation: The paper describes an improvement of the production technology for spiral channel emitters of lead glass. The production process consists of winding of the spirals in an electrical furnace, orientation of the spiral ends on an axial line, polishing of the ends of the capillaries, frosting, washing, annealing in hydrogen, and deposition of the conductive contacts. The technology developed makes it possible to increase the output of suitable channels with an internal diameter of 1 mm (with an amplification $> 10^5$) from 20 to 40 percent. The magnitudes of the channel resistances, and the permissible power dissipation are presented, and also the dependence of the output channels on the input, linear to $10^{-8} - 10^{-6}$ amp. 5 ill. 6 ref. N. S.
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USSR

UDC 621.383.292.8

AYNBUND, M. R., KOVALENKO, V. G., KOLOSOV, Yu. A., POLENOV, B. V.

"Multiplier With Continuous Dynode for Registration of Charged Particles"

Elektron. tekhnika. Nauchno-tekhn. sb. Elektronoluch. i fotoelektr. pribory (Electronic Technology. Scientific-Technical Collection. Electron Beam and Photoelectric Devices), 1970, Issue 4(18), pp 47-51 (from RZh-- Elektronika i yeye primeneniye, No 5, May 1971, Abstract No 5A193)

Translation: The principal parameters and characteristics are presented of channel electron multipliers of tubular type (spiral and curved) with an input window 1.5-mm in diameter, and of the slotted type with an input window 2 x 6 mm², studied in a counting regime of signal registration.
Summary.

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USSR

UDC 621.385.292

AYNEUND, K.R., VIL'DGRUBE, G.S., DUNAYEVSKAYA, N.V., SEMENOVA, V.B.

"Miniature Channel Photomultipliers"

Elektron. tekhnika. Nauchno-tekhn. sb. Elektronoluch. i fotoelektr. pribory
(Electronic Technology. Scientific-Technical Collection. Electron Beam And
Photoelectric Devices), 1970, Issue 3(17), pp 3-5 (from RZh--Elektronika i yeye
primeneniye, No 4, April 1971, Abstract No 4A251)

Translation: The construction is described and the principal parameters are
presented of miniature channel photomultipliers with head-on and lateral photo-
cathodes. The length of the devices is 40 mm with diameters of 13 and 10 mm,
respectively. The anode sensitivity of the specimens amounts to 1000 a/lm.
Summary.

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USSR

UDC 621.387.3

AYNETDINOVA, G.S., KOGAN, R.F., YABLONSKIY, F.M.

"Calculation Of Several Matching Circuits For Linear Gas-Discharge Indicator With Voltage Pick-Ups"

Dokl. nauchno-tekhn. konferentsii po itogam nauchno-issled. rabot za 1968-1969 gg. Mosk. energ. in-t, 1970 g. Sekts. Elektron. tekhniki. Podseks. Prom. elektroniki (Report Of The Scientific-Technical Conference On The Results Of Scientific-Research Work During 1968-1969. Moscow Power Engineering Institute, 1970. Electronic Technology Section. Industrial Electronics Subsection), Moscow, 1969, pp 145-150 (from RZh--Elektronika i yeye primeneniye, No 6, June 1970, Abstract No 6A167)

Translation: The procedure is given for calculation of a matching circuit for voltage pick-ups [datchik] of 0 ± 1 Volt and 0 ± 10 Volt with a linear gas-discharge indicator of the analog type. The basic parameters of the indicator are given with the calculations (minimum and maximum operating current, minimum current for combustion, and maximum voltage for firing) and the basic parameters of the pick-up (minimum and maximum signal at the output and the output resistance). The calculations make it possible to determine the type of compatible transistor, the voltage of the power supply and the size of the resistors of the control circuit. I.V.

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USSR

UDC 591.481.1:591.543

MEYERSON, F. Z., KRANTS, D., SADYRALIYEV, T. S., and AYNOKENOVA, R. R.,
Institute of Normal and Pathological Physiology, Academy of Medical Sciences
USSR, Moscow

"Dynamics of Protein Synthesis in the Neurons and Glia of the Brain for
Adaptation to High-Altitude Hypoxia"

Moscow, Doklady Akademii Nauk SSR, Vol 204, No 3, 1972, pp 759-762

Abstract: Adaptation is accompanied by acceleration of the development and an increase in the degree of retention of conditioned reflexes, an increase in the resistance of memory to electroshock and also an increase in the resistance of animals to sound stimulation causing convulsions. For correct evaluation of these facts it is necessary to discover in which cellular structures of the brain the above-described synthesis activation is realized since this permits an approach to the understanding of its specific role in the variations of the brain functions which are actually observed on adaptation to high-altitude hypoxia. Accordingly, an autoradiographic method was used to study the dynamics of protein synthesis in the gigantic pyramidal neurons and glial cells of the cerebral cortex and also in the neurons and glial cells of the supra-optical nucleus of the hypothalamus on adaptation to continuous and discontinuous
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MEYERSON, F. Z., et al., Doklady Akademii Nauk SSR, Vol 204, No 3, 1972, pp 759-762

hypoxia. The experiments were performed on male Wistar rats weighing 140-160 grams. The data curves presented indicate that both in the cerebral cortex and in the supraoptical nucleus of the hypothalamus adaptation to continuous hypoxia is accompanied by theoretically the same changes in intensity of the protein synthesis as adaptation to discontinuous hypoxia. In both cases, gradually progressive activation of protein synthesis is observed in the cortical and hypothalamic neurons with a simultaneous increase in the size of the cells. In the glial cells the synthesis activation increases more steeply. It is greatest in the initial period of adaptation and is accompanied not by an increase but by a decrease in the size of the cell nuclei. Just as for adaptation to discontinuous hypoxia, the activation of the synthesis and an increase in the neuron size were more pronounced for the cortex than for the hypothalamus.

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USSR

UDC 612.172.015.348.017.2-06:612.373.2

AYNOKENOVA, R. R., and KAUFMAN, O. YA.

"Dynamics of Protein Synthesis in the Contractile Myocardium and Smooth Muscles on Intramural Branches of Coronary Arteries During Adaptation to Continuous and Interrupted Hypoxia"

Moscow, Kardiologiya, No 4, 1973, Vol 13, pp 128-130

Abstract: Sets of white male Wistar rats were used to investigate protein synthesis in the walls of coronary vessels during adaptation to hypoxia. A barochamber with 6-hour exposures to increasingly rarefied air was used to test for interrupted hypoxia, while some of the rats were sent to a mountain laboratory (3,200 m) for testing for continuous hypoxia. The method of radioactive tracers was employed in all cases. The number of tracers in the smooth muscle cells of the coronary arteries and myocardium increased sharply for both continuous (high-altitude) and interrupted hypoxia. Adaptation to high-altitude hypoxia showed comparatively slight activation of protein synthesis in the contractile myocardium, while in adaptation to interrupted hypoxia results were basically the same. So a high degree of activation of protein synthesis was shown to exist in the smooth muscle cells as compared to the contractile myocardium for these types of hypoxia adaptation.

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1/2 036 UNCLASSIFIED PROCESSING DATE--13NOV70
TITLE--NOMOGRAPH FOR DETERMINING A HEAT TRANSFER COEFFICIENT BETWEEN THE
SURFACE AND THE FLUIDIZED BED -U-
AUTHOR--(03)-GELPERIN, N.I., AYSNTEYN, V.G., TOSKUBAYEV, I.N.
COUNTRY OF INFO--USSR
SOURCE--KHIM. PROM. (MOSCOW) 1970, 46(3), 225-6
DATE PUBLISHED-----70
SUBJECT AREAS--PHYSICS
TOPIC TAGS--HEAT TRANSFER COEFFICIENT, NOMOGRAPH, FLUIDIZED BED, GAS FLOW,
QUARTZ
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRA--1996/1494 STEP NO--UR/0064/70/046/003/0225/0226
CIRC ACCESSION NO--AP0118481
UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0118481

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A NOMOGRAPH FOR THE DETN. OF THE HEAT TRANSFER COEFF. ALPHA BETWEEN THE SURFACE AND A FLUIDIZED BED, AS A FUNCTION OF THE GAS VELOCITY W WAS PLOTTED BASED ON THE EQUATION OF GEL'PERIN, ET AL. (1966); IN THE CASE OF A BED OF QUARTZ PARTICLES 0.35 MM IN DIAM., THE MAX. ALPHA 267 CKAL-M PRIME² HR DEGREE WAS OBTAINED AT W EQUALS 0.455 M-SEC.

UNCLASSIFIED

1/2 027 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--BASIC PRINCIPLES OF REALIZATION OF AN ASYNCHRONIZED SYNCHRONOUS
INDUCTOR MACHINE -U-
AUTHOR--AYNVARG, A.S. A
COUNTRY OF INFO--USSR
SOURCE--YEREVAN, IZVESTIYA AKADEMII NAUK ARMYANSKOY SSR, SERIYA
TEKHNICHESKIKH NAUK, VOL 23, NO 1, 1970, PP 18-24
DATE PUBLISHED-----70
SUBJECT AREAS--ELECTRONICS AND ELECTRICAL ENGR.
TOPIC TAGS--ELECTRIC ROTATING EQUIPMENT, SIGNAL MODULATION, ELECTRIC
GENERATOR
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1987/1407 STEP NO--UR/0173/70/023/001/0018/0024
CIRC ACCESSION NO--AP0104721
UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0104721

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THEORETICAL CONSIDERATIONS ARE QUOTED CONCERNING THE CREATION OF AN ASYNCHRONIZED SYNCHRONOUS INDUCTOR MACHINE (ASIM) REPRESENTING A DEVICE WHICH REALIZES THE PHASE COMPENSATION METHOD OF A SINGLE BAND MODULATION. BASIC CONDITIONS OF REALIZATION OF ASIM WERE DETERMINED. IT WAS SHOWN THAT ASIM IS A LINEAR PARAMETRIC SYSTEM AND AS SUCH, REALIZES A SINGLE BAND MODULATION WITH MORE PRECISION THAN A NONLINEAR SYSTEM.

UNCLASSIFIED

USSR

UDC 543.45(047)

AYOLLO, Z. S., DEVDARIANI, M. V., KARABEGOV, M. A., KOMRAKOV, YU. I., POZHIDAYEV, G. M.

"General Industrial Automatic Refractometers of the State Instrument System"

Dokl. Vses. soveshch. Optich. i titrometrich. analizatory zhidk. sred, 1971.
Ch. 2 (Reports of the All-Union Conference on Optical and Titrometric Analyzers of Liquid Media, 1971, Part 2), Tbilisi, 1971, pp 9-20 (from RZh--Metrologiya i Izmeritel'naya Tekhnika, No 3, Mar 72, Abstract No 3.32.1043)

Translation: The results of interrogating 178 scientific research planning and design organizations and production enterprises representing the parameters of 427 technological media are classified. The interrogation has as its purpose the discovery of the requirements imposed on automatic refractometers for liquid materials. It was found that the automatic refractometers must have technical characteristics insuring their operation under the conditions of variation of the index of refraction from 1.3 to 1.7, a difference range of the index of refraction from $5 \cdot 10^{-4}$ to $1 \cdot 10^{-4}$ with a measurement accuracy no worse than $1 \cdot 10^{-4}$ to $5 \cdot 10^{-4}\%$ at temperatures of the measured medium from +20 to +120°C with fluctuations with respect to a given point from +2 to +5° C. The analysis of the technical characteristics of the existing automatic refractometers

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AYOLLO, Z. S., et al., Dokl. Vses. soveshch. Optich. i titrimetrich. analizatory zhidk. sred, 1971. Ch. 2, Tbilisi, 1971, pp 9-20

permits establishment of the fact that the majority of them correspond to the requirements of specific technological processes, and only a few have the possibility of adjustment of the measurement ranges. A survey of methods of varying the measurement ranges of various types of automatic refractometers is presented, and their relative advantages and disadvantages are noted, including modular construction developed by the special design office of automatic refractometers for the D1RP-D and D2RP-D automatic refractometers. The correspondence of these automatic refractometers to the requirements of GOST 14941-69 is established. The USSR State Standards Committee gave permission to manufacture the instruments for delivery to the CEMA countries. The instruments are being manufactured by the Kiev Analytical Instrument Plant. There are 2 illustrations and 2 tables.

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UDC 535.322.4.08

AYOLLO, Z. S., DEMITRIYEV, A. V., KARABEGOV, M. A., KOMRAKOV, YU. I., POZHIDAYEV, G. M., SIMONIAN, G. A.

"New Wide-Range Automatic Refractometer for Monitoring the Course of Technological Processes"

Dokl. Vses. soveshch. Optich. i titrometrich. analizatorv zhidk. sred, 1971. Ch. 2 (Reports of the All-Union Conference on Optical and Titrometric Analyzers of Liquid Media, 1971, Part 2), Tbilisi, 1971, pp 39-44 (from RZh-Metrologiya i Izmeritel'naya Tekhnika, No 3, Mar 72, Abstract No 3.32.1044)

Translation: At the present time, among automatic industrial refractometers, the systems with optical compensation for the deviations of the light beam, displacement of the light shadow interface and under variables which are a function of the index of refraction have become most widespread. The schematic and description of an automatic refractometer developed by the Special Design Office for Analytical Instrument Making are presented. This refractometer permits an increase in the dynamic measurement range by several times while retaining the given instrument error. It also permits a five-fold increase in the accuracy of measuring the concentration of the substance. There are 2 illustrations and 1-entry bibliography.

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USSR

UDC 543.544.45:535.322.4.08

AYOLLO, Z. S., DEVDARIANI, I. V., DELYUSTO, V. V., KARABEGOV, M. A., KOMRANOV, YU. I., MCHEDLISHVILI, K. A.

"Refractometric Detector for Liquid Chromatographs"

Dokl. Vses. soveshch. Optich. i titrometrich. analizatory zhidk. sred, 1971, Ch. 2 (Reports of the All-Union Conference on Optical and Titrometric Analyzers of Liquid Media, 1971, Part 2), Tbilisi, 1971, pp 60-65 (from RZh--Metrologiya i Izmeritel'naya Tekhnika, No 3, Mar 72, Abstract No 3.32.1123)

Translation: A model of a refractometric detector developed at the Special Design Office for Analytical Instrument Making is described. The detector is designed for operation with a gel filtration chromatograph. The sensitivity threshold of the gel chromatograph is 10^{-3} - 10^{-4} mg/ml of analyzed component. The sensitivity of the recording differential refractometer when measuring the index of refraction must be no worse than $1 \cdot 10^{-6}$ - $1 \cdot 10^{-7}$. The check of the sensitivity of the refractometer performed with respect to the height of the peak on the chromatograms demonstrated the reliability of the analysis at $5 \cdot 10^{-5}$ mg/ml. The device was developed to investigate the molecular mass distribution of polymers, but the experimental studies demonstrated the possibility of using a differential refractometer (without a chromatograph) for any refractometric measurements. There are 4 illustrations.

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AYRADETОВ, E. L.

POWER MECHANICS

SG: JPRS 55466
17 MAR 72

DEBBI

IRREGULARITY OF LOADING OF SATELLITES IN PLANETARY MECHANISMS

Article by E. I. Aronson, A. P. Gornik, M. A. Ginzburg, Moscow, Vysokomol'skoe Soedin. Mekhanizm i Termodinam. Perevalant, Russian 1971, pp 66-85]

One of the principal indices characterizing the quality of a primary mechanism is the coefficient of satellite loading irregularity, equal to the ratio

$$K_{12}^* = F_{\max}^* P_{av}^* \quad (1)$$

where P_{\max} is the maximum load on one of the satellites; P_{av} is the average (calculated) load on the satellites.

Satellite loading irregularity is determined by the errors of manufacture and mounting of gears and is not, in the general case, constant in time. Converting to deformations in gear meshing we write the formula for N_{Σ} in the form

$$\chi_{11} = \delta_{\max} / \delta_{av} = 1 + (\Delta t_{eff} / \delta_{av}), \quad (2)$$

where δ_{\max} is the maximum deformation in the gears of one of the satellites; δ_{av} is the average (calculated) deformation in the gears of a satellite with central gears; $\Delta \epsilon_{\text{ef}}$ is the effective matching error.

Primary errors can be divided in terms of their influence on meshing load into two basic groups. The effect of the first group of primary errors (radial wobble of gear rims, eccentric mounting of gears in bearings) does not remain constant in time, but depends on the mutual location of the parts of the planetary mechanism. The influence on the second group of primary errors (errors in the location of borings for the second group of the sun wheel, gaps between the satellites and satellite axes, between satellite axes and sun wheel borings, errors in thickness of satellite

1/2 035 UNCLASSIFIED PROCESSING DATE--09OCT70
TITLE--SOME PECULIARITIES OF NEURONAL ACTIVITY IN THE
CEREBELLO, THALAMO, CORTICAL REGULATORY SYSTEM -U-
AUTHOR-(02)-AYRAPETIAN, A.A., VAGANYAN, L.G.
COUNTRY OF INFO--USSR A
SOURCE--FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA, 1970, VOL 56,
NR 4, PP 527-534
DATE PUBLISHED-----70
SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES
TOPIC TAGS--NEUROLOGY, THYMUS GLAND, CEREBRAL CORTEX, MEDICAL R AND D,
STIMULATED EMISSION
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1983/1191 STEP NO--UR/0239/70/056/004/0527/0534
CIRC ACCESSION NO--AP0054090
UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--09OCT70

CIRC ACCESSION NO--APO054090

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ALTERATIONS OF UNIT ACTIVITY ON THE UNSPECIFIC THALAMUS (USTH) DURING THE CENTRAL CEREBELLAR NUCLEI STIMULATION, AND IN THE SENSORIMOTOR CORTEX DURING THE USTH STIMULATION, WERE STUDIED USING THE EXTRACELLULAR RECORDING. BOTH THE DENTATE AND INTERPOSITUS NUCLEI AND THE USTH LOW FREQUENCY STIMULATION EXERTED A SYNCHRONIZING EFFECT, MORE DISTINCT DURING THE USTH STIMULATION. THE ABOVE NUCLEI SYSTEMS SHOWED AND EMPHASIZED INHIBITORY EFFECT EXCEPTING THE N. VA, WHERE PREFERABLY A FACILITATORY INFLUENCE WAS NOTED. IN MANY CASES, CEREBELLAR STIMULATION ELICITED IN THE USTH SOME COMPLEX NEURONAL RESPONSES, WITH OBVIOUS REGULATORY ROLE OF THE INHIBITORY PROCESS. THE NEURONAL BASIS OF THE CEREBELLO THALAMO (USTH), CORTICAL REGULATORY SYSTEM IS DISCUSSED.

UNCLASSIFIED

USSR

UIC 612.822

AYRAPETYAN, A. A., Department of Human and Animal Physiology, Yerevan State University

"A Physiological Description of Rhythmic Activity in Neurons of Nonspecific Brain Systems"

Yerevan, Biologicheskii Zhurnal Armenii, Vol 25, No 6-7, Jun/Jul 72, pp 116-129

Abstract: Rhythmic activity of neurons in the centromedial nucleus (n. CM) of the thalamus was recorded in immobilized cats. Afferent activity was attained by electrostimulation of the central nuclei of the cerebellum and the midbrain reticular formation, while efferent activity was judged by the bioelectric activity of neurons in the sensorimotor cortex in response to stimulation of the n. CM. The rhythmic patterns of two afferent neurons are described. In general a significant spike is recorded after a 15 msec latent period in response to one-time stimulation of only a particular cerebellar central nucleus (usually n. dentatus). As the stimulation frequency increases, responses vary depending on which nucleus is stimulated and the particular frequency. When compared to responses of neurons in specific brain systems, nonspecific neuron responses are less active and have a longer latent period. A stable background rhythm is frequently encountered in such neurons, which is suppressed immediately

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AYRAPETYAN, A. A., Biologicheskii Zhurnal Armenii, Vol 25, No 6-7, Jun/Jul 72, pp 116-129

upon stimulation of the n. CM but recovers only after a 300 msec to 1.5 sec poststimulation inhibition period. Efferent responses are usually generalized, though specific reactions are recorded occasionally. Lower stimulating pulse frequencies (3/sec) cause spikes to appear but do not disturb background rhythm. At 7-10 pulses/sec background activity disappears entirely, and neuron discharges become synchronized with the stimulating pulses. Higher frequencies (20/sec) disrupt the synchrony gradually. Among other possibilities, it is most likely that the long latent phase in n. CM response is the result of depolarization of axo-axon synapses, which leads to presynaptic inhibition. The data obtained indicate that specific thalamic neurons are responsible for generating the rhythmic activity of brain structures.

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USSR

UDC 617-001.28-092.9-085.272.6,576.963.32

AYRAPETYAN, F. O., AVETYAN, N. G., and ALAVERDYAN, M. I., Radiobiology
Sector, Ministry of Health, Armenian SSR

"Chemical Protection and Comprehensive Treatment of Acute Radiation Sickness
in Mice Irradiated With Sublethal Doses"

Yerevan, Biologicheskiye Zhurnal Armenii, No 7, 1971, pp 75-80

Abstract: White mice received L-cysteine prior to irradiation (500 r) and immediately afterward chondroitinsulfuric acid, sigmamicin, colimycin, and vitamin B₆ daily for 20 days. All the animals developed typical radiation sickness, but the symptoms were much milder and recovery set in sooner in the treated animals than in the irradiated but untreated control. For example, restoration of the WBC set in after 7 to 10 days, whereas leukocytopenia persisted and increased in the controls. The survival rate of the experimental animals was 80 to 82% compared with 22% in the controls. The viscera of the treated animals contained far fewer hemorrhages than the controls. The combination of cysteine, antibiotics, and vitamin B₆ was effective in restoring tissue permeability, thus inhibiting the development of postradiation hemorrhages and blocking autoinfectious processes. In view of the complexity of the pathogenesis of acute radiation sickness and the variety of pathological changes,
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AYRAPETYAN, F. O., et al., Biologicheskiye Zhurnal Armenii, No 7, 1971,
pp 75-80

therapy must be comprehensive and include agents that act on the main syndromes: hematopoietic, hemorrhagic gastrointestinal, and infectious disorders.

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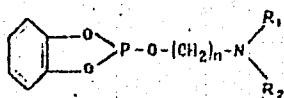
UDC 547.26'118.07

KHASKIN, A. N., SAKISYAN, L. A., KHUDOYAN, K. L., AYRAPETYAN, S. G., and
ZAVLIN, P. M., Leningrad Institute of Cinema Engineers

"A Method of Making N-Substituted Aminoalkyl Esters of Pyrocatecholphosphorus
Acid"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki,
1970, No 25, Soviet Patent No 277781, class 12, filed 4 Apr 69, published
5 Aug 70, p 27

Translation: This Author's Certificate introduces a method of making N-
substituted aminoalkyl esters of pyrocatecholphosphorous acid of general
formula



where n is 2 or 3, R₁ is C₂H₄OH, an alkyl or a phenyl, and R₂ is H or an
alkyl. As a distinguishing feature of the patent, the corresponding N-
substituted alkanolamines are treated with pyrocatecholchlorophosphite
in an organic solvent with subsequent isolation of the product by the
action of an alkoxide of an alkali metal.
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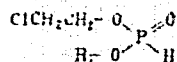
UDC: 547.26'118.07

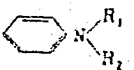
SARKISYAN, L. A., KHASKIN, A. N., ZAVLIN, P. M., AYRAPETYAN, S. G., AYVAZYAN, M. K.,
Leningrad Institute of Motion Picture Engineers

"A Method of Producing Acid Esters of β -Chloroethylphosphorous Acid"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 28,
1970, Soviet Patent No 280474, filed 18 Mar 69, p 25

Abstract: This Author's Certificate introduces: 1. A method of producing acid esters of β -chloroethylphosphorous acid of the general formula



where R is naphthyl,  $\text{CH}_2\text{CH}_2\text{N}(\text{R}_1)(\text{R}_2)$, R_1 is an alkyl, oxyalkyl, diphenylmethyl,

aryl, R_2 is H, an alkyl, oxyalkyl. As a distinguishing feature of the patent, amino-phenyl, alkanolamine or hydroxynaphthalene is interacted with ethyleneglycolphosphorous acid chloride in the presence of hydrogen chloride with subsequent isolation of the goal product by conventional methods. 2. A modification of this method in which the process is carried out in an organic solvent such as ether. 3. A modification of the method in which the process is carried out with H_2SO_4 .
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USSR

UDC 619:616.9-085.37:576.809.33

AYRAPET'YAN, V. G., Professor and KHACHATRYAN, A. B., Candidate of Veterinary Sciences, Armenian Scientific Research Institute of Animal Husbandry and Veterinary Science

"Immunogenic Properties of Vaccines Prepared from Viruses Grown on Tissue Cultures"

Moscow, Veterinariya, No 9, Sep 70, pp 42-44

Abstract: The following vaccines were prepared: an inactivated aluminum hydroxide formol vaccine against Aujeszky's disease from a virus grown on a kidney tissue culture from 5-15 day old rabbits; a crystal-violet vaccine against hog cholera from a virus grown on a fetal pig kidney tissue culture; a hog cholera virus strain attenuated by passage through transplanted PP cells; dry virus vaccines against poultry pseudopest from strains B₁, H, and La Sota grown on chick fibroblasts tissue cultures and fetal pig kidneys; and type A poultry pseudopest virus attenuated by passage through chick fibroblasts tissue cultures and fetal pig kidneys. Animal experiments showed that these vaccines had immunogenic properties as good as those of vaccines prepared from virus-containing blood and organs, and also that they did not produce reactions.

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USSR

AYRAPETYAN, V. G. and KHACHATRYAN, Veterinariya, No 9, Sep 70, pp 42-44

The inactivated vaccine against Aujeszky's disease and the dry virus vaccines against poultry pseudopest were approved by the Scientific and Technical Council of the Ministry of Agriculture USSR. The approved vaccines are now being produced by the Kherson and Stavropol' Biological Plants and are undergoing field tests.

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USSR

UDC 612.766.2:007.51

AYRAPETYANTS, V. A. and ZOLINA, Z. M., Institute of Industrial Hygiene and Occupational Diseases, Academy of Medical Sciences USSR

"Shifts in Physiological Functions in Operators Doing Tense Work and in Operators Doing Monotonous Work"

Moscow, Gigiyena Truda i Professional'nyye Zabolevaniya, No 2, 1973, pp 40-43

Abstract: Cardiovascular and higher nervous activities were compared in two groups of healthy women age 30 to 50, one working as train dispatchers, the other monitoring assembly line work in an automobile plant. In the dispatchers, cardiovascular changes were characterized by a steady elevation of maximum blood pressure from the beginning to end of the work shift, the rise being especially pronounced at times of great stress. In the automobile plant workers, cardiovascular changes were insignificant, consisting mainly in a slowing of the heart beat and low blood pressure. With respect to higher nervous activity, the lability of the visual analyser in the dispatchers was phasic, increasing during the first 4 hours of work, then decreasing for the next 4 hours, but increasing once again toward the end of the shift. Also memory and attention remained unimpaired throughout the day. In the automobile plant workers, on the other hand, the lability of the visual analyser, memory, and attention steadily declined, reaching the lowest point at the end of the shift.

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USSR

UDC: 77.01:53

AYRAPETYANTS, A. V., SOBOLEVA, V. V., and TSEKHOMSKIY, V. A.

"Spectral Research on Photochrome Glass, Sensitized by Silver Halides"

Moscow, Zhurnal Nauchnoy i Prikladnoy Fotografii i Kinematofotografii, Vol I, No 1, Jan-Feb 72, pp 27-35

Abstract: The article deals with an investigation of the optical properties of photochrome glass, sensitized by silver chloride and silver bromide. Sensitivity spectra are determined for processes of coloration and light-caused decolorization for samples 2.5 mm thick. For silver chloride glass, the most effective light for coloration is with ≈ 330 millimicrons, for decolorization, 450-1250 millimicrons; for silver bromide glass, light for coloration is 390 millimicrons, and for decolorization, 630 millimicrons. The influence of temperature upon the supplementary-absorption spectra was studied; also studied was the change of the supplementary-absorption spectra in processes of darkness-caused decolorization and decolorization by light of various wave lengths. The obtained results support the supposition of the colloidal nature of particles with a supplementary absorption band. Nine figures. 12 references.

1/1

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USSR

UDC 612.815.1+612.826

AYRAPET'YANTS, E. SH., AUBKOVA, B. A., and FIGURINA, I. I., Laboratory of Comparative Physiology of Internal Analysors, Institute of Physiology imeni I. P. Pavlov, Academy of Sciences, USSR, Leningrad

"On the Role of Thalamic Structures in the Function of Visceral Analysors in Dogs"

Leningrad, Fiziologicheskii Zhurnal SSSR, imeni I. M. Sechenov, Vol 59, No 8, Aug 73, pp 1,158-1,167

Abstract: The retrograde degeneration of the thalamic nuclei of dogs was studied following removal of various areas of the visceral cortex. Conditioned reflexes of stomach and intestinal receptors were used as functional indicators of visceral analysor activity. It was observed that bilateral removal of the precoronary region caused the greatest degeneration in the ventral nucleus of the thalamus with other parts of the thalamo-cortical complex degenerating as well. This was accompanied by an immediate weakening of visceral afferent signals, with a resumption of visceral analysor activity in the second postoperative month. After removal of the postcoronary region of the cortex degeneration of the ventral and contralateral nuclei was noted. In this case visceral signals were disturbed for only 18 days. If the post-
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USSR"

AYRAPET'YANTS, E. SH., et al., Fiziologicheskiy Zhurnal SSSR imeni I. M. Sechenov, Vol 59, No 8, Aug 73, pp 1,158-1,167

coronary region was removed with destruction of the white substance underlying the cortex, complete degeneration of the ventral nucleus and partial degeneration of the medial dorsal and central lateral nuclei were seen. However visceral conditioned reflexes were also reestablished in 3 weeks. These results were said to show that both the thalamus and the cortex have structures involved in transmission and analysis of visceromechanical conditioned signals, but that these are differently organized. The main link of the visceral cortex is considered indispensable for normal activity of the visceral analyzer.

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AYRAPET'YANTS, E. Sh.

Bats

[Article by E. Sh. Ayrapet'yan, V. B. Zorichin, B. M. Savitskiy, M. G. Dzhafarzadeh, N. S. Khabibov, No 3, 1972, submitted 12 February 1971, pp 723-725]

SPATIAL ORIENTATION OF BATS UNDER THE INFLUENCE OF INCREASED GRAVITY

UDC 591.185.1491.603.5

JPRS 56073
23 MAY 1972
(continued)

Data on the orientation of bats in space mainly by echolocation [1]. Presumably, during flight this mechanism must interact closely both with the functional system of acceleration to ensure the perception of body position in space and with the accelerations caused by change in direction and speed of flight [2, 3]. However, no experimental data are available as yet on this matter. One possible way of studying it is to determine the nature of spatial analysis in echolocating animals after sharp functional changes in their acceleration system resulting from exposure to increased gravity.

Ultrasonic experiments were carried out on two bat species, *Myotis myotis* and *Myotis myotis*. Increased gravity (hypergravity) was created by rotation on a centrifuge with a radius of 2 m. The animals were subjected to single or series (of 4 single) accelerations in two directions: head - pelvis (0°) or pelvis - head (180°) - at intensities of 25 (Δg) was 5 to 6 g/sec while the deceleration gradient was 10 to 12 g/sec. The animals were kept in form-fitting containers in the centrifuge in order to prevent local accelerations.

The effect of preceding hypergravity on spatial analysis was judged from the ability to detect and overcome obstacles in the form of steel rings of threshold(?) diameter (0.11 to 0.14 m) during vertically. The distance between them in the experiments with *M. myotis* and *E. f. f. f.* was 50 and 25 cm, respectively. The ratio of correct (without touching) and wrong (touching the wires) flights through the barrier served as an indicator of the state of spatial analysis. The threshold values of the diameter of the wires (75% significance) found by each of the experimental animals were determined in control experiments and before each exposure to acceleration. The animals' reaction to hypergravity was assessed from their general condition and behavior as well as from the coordination of

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USSR

UDO 621.382.322

AYRAPETYANTS, S.V., KOMAROVSKIKH, K.F., MURYGIN, V.I., POSPELOV, V.V., STAFEYEV, V.I.

"Field Effect Transistor"

USSR Author's Certificate No 263750, filed 4 Dec 68, published 15 June 70 (from
RZh--Elektronika i yeye primeneniye, No 12, December 1970, Abstract No 12B422P)

Translation: A field effect transistor is proposed which contains one p-n junction and an insulated gate electrode, with the p-n junction located perpendicular to the gate electrode, and the length of the base more than twice the diffusion length of the minority charge carriers. The transistor has a region of negative resistance in the volt-ampere characteristic (S-type).

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1/2 012 UNCLASSIFIED PROCESSING DATE--11SEP70
TITLE--A FIELD EFFECT TRANSISTOR -U-
AUTHOR--AYRAPETYANTS, S.V., KOMAROVSKIY, K.F., MURYGIN, V.I., POSPELOV,
V.V., STAFYEV, V.I.
COUNTRY OF INFO--USSR A
SOURCE--PATENT NO 263750
REFERENCE--MOSCOW, OTKRYTIYA, IZOBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI NO
DATE PUBLISHED--10FEB70
SUBJECT AREAS--ELECTRONICS AND ELECTRICAL ENGR.
TOPIC TAGS--PATENT, FIELD EFFECT TRANSISTOR, TRANSISTORIZED CIRCUIT
CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAE--1992/1098 STEP NO--UR/0482/70/000/000/0000/0000
CIRC ACCESSION NO--AA0112220

UNCLASSIFIED

2/2 012

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AA0112220

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THIS AUTHOR'S CERTIFICATE INTRODUCES A FIELD EFFECT TRANSISTOR WHICH CONTAINS A PN JUNCTION AND AN ISOLATED GATE ELECTRODE. THE TRANSISTOR DIFFERS BECAUSE TO PRODUCE AN S SHAPED CURRENT VOLTAGE CHARACTERISTIC, THE PN JUNCTION IS ARRANGED PERPENDICULARLY TO THE GATE ELECTRODE, AND THE BASE IS LONGER THAN TWO DIFFUSION LENGTHS FOR THE MINORITY CHARGE CARRIERS.

UNCLASSIFIED

USSR

A

UDC 621.382.33

AYRAPETYANTS, S. V., KOMAROVSKIKH, K. F., MURYGIN, V. I., POSPELOV, V. V.,
STAFEYEV, V. I.

"A Field-Effect Transistor"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 8,
10 Feb 70, pp 57-58, Patent No 263750, Filed 4 Dec 68

Translation: This Author's Certificate introduces a field-effect transistor which contains a PN junction and an isolated gate electrode. The transistor differs because to produce an S-shaped current-voltage characteristic, the PN junction is arranged perpendicularly to the gate electrode, and the base is longer than two diffusion lengths for the minority charge carriers.



1/1

Pharmacology and Toxicology

USSR

UDC 591.105.56-13-42

AYRUMYAN, V. A., and BABINA, E. YA., Yerevan Zoological and Veterinary
Institute

"Change of Lactic Acid in the Process of Maturation of Meat in Calves Treated
with Chlorophos Solution"

Yerevan, Biologicheskii Zhurnal Armenii, Vol 24, No 12, Dec 71, pp 100-101

Abstract: The treatment of calves with an 8% aqueous solution of chlorophos has an effect upon the quantity of lactic acid in the meat in the process of its maturation. In the meat of calves killed one and three days after chlorophos treatment, a maximum increase of the lactic acid content was noted twenty-four hours after slaughtering, more than double the amount 2-3 hours after slaughtering. However, on the 15th day of meat maturation, the quantity of lactic acid is considerably less than in the meat of intact calves and calves slaughtered 6 days after chlorophos treatment.

USSR

UDC 591.105.56-13-42

AYRUMYAN, V. A., and BABINA, E. YA., Yerevan Zooveterinary Institute

"Changes In Glycogen Level During Maturation of Meat of Bull-Calves Treated with a Chlorophos Solution"

Yerevan, Biologicheskii Zhurnal Armenii, Vol 24, No 11, 1971, pp 111-112

Abstract: Bull-calves were treated with an 8% aqueous chlorophos solution (a compound used against ecto- and endoparasites), and slaughtered 1, 3, and 6 days later. Meat sections were analyzed for glycogen content after various periods of maturation. In the control group, glycogen concentration was about 700 mg% 2-3 hrs after slaughter and gradually decreased with increasing period of maturation to reach about 50 mg% on the 15th day. In animals slaughtered 24 hrs and 3 days after treatment, the initial glycogen concentration was about 2,000 mg%. Though it decreased with time, it was still two to five times as high as in controls on the 15th day of maturation. However, in animals slaughtered 6 days after treatment, the initial glycogen concentration was essentially the same as in the controls. During maturation, glycogen decomposition was delayed just slightly, to reduce glycogen concentration to about 70 mg% on the 15th day. It was concluded that 8% chlorophos decelerates conversion of glycogen into lactic acid but that this effect is of brief duration.

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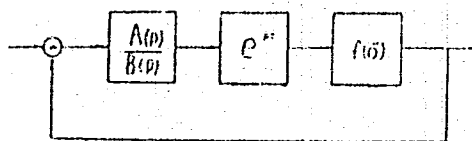
UDC: 621.3.078

AYSAGALIYEV, S. A., Kazakh State University

"Concerning the Determination of the Region of Absolute Stability of Non-linear Systems With Delay"

Leningrad, Izvestiya VUZov: Priborostroyeniye, Vol 16, No 2, 1973, pp 31-35

Abstract: It is shown that the region of absolute stability in the space of parameters of nonlinear systems with delay can be determined by methods proposed by the author in previous papers. The following system is considered:



The characteristic of the nonlinear element $\phi(\sigma)$ satisfies the condition

$$h_1\sigma^2 \leq \sigma\phi(\sigma) < K\sigma^2.$$

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AYSAGALIYEV, S. A., Izvestiya VUZov: Priborostroyeniye, Vol 16, No 2, 1973, pp 31-35

If the zeros of polynomial $B(p)$ are located in the left half-plane, then the conditions of absolute stability of the system take the form

$$\frac{1}{K} + \operatorname{Re}(1 + j\omega q) \frac{A(j\omega)}{B(j\omega)} e^{-j\omega\tau} \geq 0, \quad (q \geq 0, 0 \leq \omega < \infty) \quad (1)$$

Introducing the notation $A(j\omega) = A_1(\omega^2) + j\omega A_2(\omega^2)$, $B(j\omega) = B_1(\omega^2) + j\omega B_2(\omega^2)$, we have from (1)

$$\frac{1}{K} (B_1^2 + \omega^2 B_2^2) + \{A_1 B_1 + \omega^2 A_2 B_2 - \omega^2 q (A_2 B_1 - A_1 B_2)\} \cos \omega\tau - \\ - \omega [q A_1 B_1 + q \omega^2 A_2 B_2 + A_2 B_1 - A_1 B_2] \sin \omega\tau \geq 0$$

When $0 \leq \omega < \infty$. This implies that the condition of absolute stability of (1) amounts to positivity of the polynomial

$$D(\omega, \cos \omega\tau, \sin \omega\tau) = (a_0 + b_0 \cos \omega\tau) \omega^{2n} + b_1 \sin \omega\tau \omega^{2n-1} + \\ + (a_2 + b_2 \cos \omega\tau) \omega^{2n-2} + \dots + b_{2n-1} \sin \omega\tau \omega + (a_{2n} + b_{2n} \cos \omega\tau) \geq 0$$

for non-negative finite ω . The coefficients a_i , b_i are defined in terms of the parameters of the system. The region of absolute stability is de-

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AYSAGALIYEV, S. A., Izvestiya VUZov: Priborostroyeniye, Vol 16, No 2, 1973, pp 31-35

terminated for this case and for a control system with several nonlinear delay elements

$$z_i + \sum_{j=1}^n w_{ij} z_j = 0, \quad 0 \leq \frac{\varphi_j(z_1) - \varphi_j(z_2)}{a_1 - a_2} \leq \mu, \quad \varphi_j(0) = 0; \quad (i, j = 1, \dots, n),$$

where

$$w_{ij} = \frac{A_{ij}(j\omega) + B_{ij}(j\omega) e^{-j\omega\tau}}{C_{ij}(j\omega) + F_{ij}(j\omega) e^{-j\omega\tau}}.$$

An example is given of determination of the region where forced motions in a specific system are absolutely stable.

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USSR

AYSINA, Zh. I., Pediatric Department, Central Hospital of the Fourth Main Administration, Ministry of Health Kazakh SSR

"Clinical Picture of Pneumonia in Children Ill With Influenza During the 1970 Outbreak"

Alma-Ata, Zdravookhraneniye Kazakhstana, No 7, 1971, pp 44-46

Abstract: Bronchial pneumonia was diagnosed in 100 children of preschool age hospitalized with influenza in January-March 1970. Both diseases took the most severe course in the youngest children; 48 children had severe influenza and 42 children had moderate influenza, while most children had moderate bronchial pneumonia. Almost all were hospitalized only after influenza was complicated with pneumonia, and most had a history of frequent other diseases and generally poor health. They had wet and dry noises in the lungs, muffled heart sounds, sometimes with systolic murmurs, weak cardiac contractions, enlarged pulmonary roots, and enlarged liver. In addition to pneumonia, 56 children had otitis, two had antritis, and two had dyspepsia. Blood tests revealed leukopenia in 42 children, leukocytosis in 15, and normal white cell count in 43. Monocytosis and eosinophilia were observed in 65 children, hypokalemia, hypocalcemia, and hyponatremia in 50 children, and hypochromic

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USSR

UDC 615.916:546

AYTBAYEV, T. KH., YELEBEKOVA, R. S.

"Functional State of the Liver of Rats Under the Joint and Separate Effects of Hydrogen Fluoride and Sulfur Anhydride"

Tr. NII krayev. patol. KazSSR (Works of the Scientific Research Institute of Marginal Pathology of the Kazakh SSSR), 1972, No 23, pp 104-106 (from RZh--Farmakologiya. Khimioterapevticheskiye Sredstva. Toksikologiya, No 3, Mar 73, Abstract No 3.54.685)

Translation: Male and female rats were subjected for four months to inhalation poisoning (six hours a day, six times a week) with HF in a concentration equal to the MPC (first group) and 0.5 of the MPC (second group), SL_2 in a concentration equal to the MPC (third group) and $HF+SO_2$ in a concentration equal to the MPC (fourth group) or 0.5 MPC (fifth group). The increase in body weight of the animals in the control group was 72 percent of the background; in the first group it was 17 percent; in the third group 44 percent; in the fourth group 52 percent and in the fifth group, 45 percent. The glycogen content in the liver of the animals in the first group was 0.96; in the second group, 1.54; in the third 1/2

USSR

AYTBAYEV, T. KH., YELEBEKOVA, R. S., Tr. NII krayev. patol.
KazSSR, 1972, No 23, pp 104-106

group, 0.37; in the fourth group, 1.7 and in the fifth group, 1.63 g% (in the control it was 3.36 g%). The separation of hippuric acid with the urea was increased in the animals of the third and fourth groups. For the animals in the first and second groups, an increase in the lipid content in the liver was noted. The selective effect of HF on the general state of the animals and SO₂, on the antitoxic and carbohydrate function of the liver and the toxicity under the combined effect of both compounds on the MPC level are noted.

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USSR

UDC 615.916:546

AYTBAYEV, T. KH., ALMANIYAZOVA, V. M.

"Combined Effect of Hydrogen Fluoride and Sulfur Anhydride on the Activity of Certain Respiratory Enzymes of the Brain and the Oxygen Requirement of Experimental Animals"

Tr. NII krayev, patol. KazSSR (Works of the Scientific Research Institute of Marginal Pathology of the Kazakh SSR), 1972, No 23, pp 101-103 (from RZh--Farmakologiya. Khimioterapevticheskiye Sredstva. Toksikologiya, No 3, Mar 73, Abstract No 3.54.687)

Translation: For four months a rat was subjected to inhalation poisoning (six hours a day six times a week) with HF (first group), SO₂ (second group), in concentrations equal to the MPC, HF + SO₂ on the MPC level (third group) or 0.5 MPC (fourth group). The activity of the succinate dehydrogenase (SDH) in the brain cells in the animals of the first, second, third and fourth groups was 4.8, 5.8, 6 and 8.1 mg of formazine (9.43 in the control); the activity of the cytochromoxydase was 22, 128, 38 and 34 provisional units (178 in the control). The O₂ content per hour per 100 grams of animals was 358.2, 254, 221 and 229 ml (in the amount of 192.7
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USSR

AYTBAYEV, T. KH., ALMANIYAZOVA, V. M., Tr. NII krayev. patol.
KazSSR, 1972, No 23, pp 101-103

m²). Attention is given to the selective effect of the IIF with respect to the cytochrome oxydase and the SO₂ with respect to the succinate dehydrogenase and also the sensitivity of the brain of the animals to the effect of both compounds on the MPC level.

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USSR

UDC 616.981.455-085.351-039.71-07:616.15-097.5-078.7

KANATOV, Yu. V., AYTKALIYEV, B. A., SHMUTER, and TYULEMBAYEV, M. A., Central Asian Anti plague Institute, Alma-Ata, and Central Institute for the Advanced Training of Physicians, Moscow

"Sensitivity of Reaction With Sensitized Erythrocytes for Detection of Antibodies in Persons Vaccinated Against Tularemia"

Moscow, Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii, No 10, 1971, pp 93-97

Abstract: The accumulation of antibodies in persons vaccinated against tularemia was traced using the agglutination, passive hemagglutination, and antigen neutralization tests and the sensitivity of these tests was compared. Specific antibodies were detected from 3 to 15 days after vaccination by all the serological tests used. The antibody titers were somewhat higher in the passive hemagglutination test than in the agglutination test during the first few days after vaccination. The titers were highest in the antigen neutralization test at all the periods checked, mainly due to detection of the total complete and incomplete antibodies.

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USSR

UDC 632.95

AZERBAYEV, I. N., AYTKHOZHAYEVA, M. Zh., TSOY, L. A.

"Acetylene-Containing Ureas"

Alma-Ata, Khimiya atsetilena i tekhnol. karbida kal'tsiya -- sbornik (Chemistry of Acetylene and Technology of Calcium Carbide -- collection of works), "Kazakhstan," 1972, pp 157-160 (from RZh-Khimiya, No 9, May 73, abstract No 9N534 by M. G. Kaplun)

Translation: Substances of the formulas $H_2NCONHC(R)(R')C\equiv CH$ (I) and $m-XC_6H_4NHCONHC(R)(R')C\equiv CH$ (II) (R and R' = alkyls or RR' = cycloalkyl, $X = H$ or Cl) are synthesized in reactions of acetylene amines with nitrourea (III), with $PhNCO$, or with $m-ClC_6H_4NCO$. Example. 0.01 mole of $Me_2C(NH_2)C\equiv CH$ (IV) is added to 0.01 mole of III in 4 ml of distilled water at about $20^\circ C$, mixed for 30 minutes at the same temperature, and then at $50-55^\circ C$ until gases are no longer given off, and then filtered. The filtrate is evaporated to 1/4 original volume, cooled, the precipitate is separated and crystallized from water and then from heptane. 1.09 grams of I ($R = R' = Me$) are obtained, $C_6H_{10}N_2O$, yield 70.7%, melting point $151^\circ C$. The following compounds of type I are synthesized by analogous methods (given are R , R' or RR' , molecular formula, yield in % and melting point 1/2

USSR

AZERBAYEV, I. N., et al., Khimiya atsetilena i tekhnol. karbida kal'tsiya -- sbornik, "Kazakhstan," 1972, pp 157-160

in °C): Me, Et, $C_7H_{12}N_2O$, 77.2, 103; Me, Pr, $C_8H_{14}N_2O$, 89.7, 64; cyclo- C_6H_{11} , $C_{10}H_{15}N_2O$, 90.4, 129. 0.01 mole of PhNCO is gradually added with cooling to 0.01 mole of IV in 3 ml of absolute C_6H_6 . The mixture is held for 40 minutes at 40-50°C, cooled, and evaporated until dry on the following day. The residue is doubly crystallized from heptane giving 1.72 g of II (R = R' = Me, X = H), $C_{12}H_{14}N_2O$, yield 85.1%, melting point 153°C. The following compounds of type II are synthesized by analogous methods (given are R, R' or RR', X, molecular formula, yield in %, melting point in °C): Me, Et, H, $C_{13}H_{16}N_2O$, 86.1, 111; Me, Pr, H, $C_{14}H_{18}N_2O$, 99.6, 104; cyclo- C_6H_{11} , H, $C_{16}H_{19}N_2O$, 95.3, 151; Me, Me, Cl, $C_{12}H_{13}ClN_2O$, 93.2, 144; Me, Et, Cl, $C_{13}H_{15}ClN_2O$, 95.8, 123; Me, Pr, Cl, $C_{14}H_{17}ClN_2O$, 99.8, 91; cyclo- C_6H_{11} , Cl, $C_{16}H_{18}ClN_2O$, 98, 1, 133. The structure of the synthesized compounds I and II is confirmed by the data of IR spectra. The compounds were produced in a search for mutagens, herbicides and soil sterilizers.

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AYTRHOZHIN, S.A.

SPRS 5/10/68
C.73

XII-15. CHARACTERISTIC FEATURES OF THE GROWTH OF EPITAXIAL FILMS OF CADMIUM
SULFIDE ON SOME ALIBY COMPOUNDS

[Article by S. A. Aytrhozhin, L. G. Krasnaya, Moscow: Novosibirsk, III
Sovetskoye Radio, 1972, p. 179]
Krasnaya, L. G. and Aytrhozhin, S. A. Trudy Akad. Nauk SSSR, Ser. Fiz.-Mat. Nauki, 1972, No. 1, p. 179.

Homocatalytic films of cadmium selenide have been grown by the gas
transport method in a hydrogen current on substrates made of semiconductor ma-
terials: tellurium arsenide, tellurium antimonide, indium antimonide, and gallium
phosphide.

It was demonstrated that the growth of the epitaxial films of cadmium
selenide on Alibz takes place at lower temperatures than on dielectric sub-
strates. The minimum temperature of the epitaxial growth is 350° C.

The characteristic features of the growth of cadmium selenide films on
the (III) and (III) surface of Alibz are discussed.

Single Crystals

USSR

UDC 548.52:539.23

AYTKHOZHIN, S. A., and TEMIROV, Yu. Sh., Institute of Radio Engineering and Electronics, Academy of Sciences USSR

"The Production of CdTe Single-Crystal Films by the Method of Condensation From the Vapor Phase in a Hydrogen Flow"

Moscow, Kristallografiya, Vol 15, No 5, Sep-Oct 70, pp 1057-1059

Abstract: The authors used the method of condensation from vapor in a hydrogen flow for the production of CdTe single-crystal films. The CdTe films were grown by the open-tube method. Substrates of synthetic mica, synthetic sapphire, gallium arsenide, and fluorite were used. The structure of the resultant films was studied by the electron diffraction method (EG-4 and EG-100 electron-diffraction cameras), as well as microscopically (MIM-8 microscope). It was found that the grown films represent the cubic phase of CdTe. The thickness of the CdTe layers varies from a few microns to several hundred, depending on the precipitation process time. It is possible to obtain single-crystal layers with a thickness of the order of 1 mm. The optimal production conditions are described.

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USSR

AYTKHOZHIN, S. A., and TEMIROV, Yu. Sh., Kristallografiya, Vol 15, No 5, Sep-Oct 70, pp 1057-1059

The authors thank Z. A. MAGOMEDOV, R. A. RABADANOV, and N. N. MAGOMEDOV for providing the sapphire substrates and for taking the electron-diffraction patterns.

2/2

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Receivers and Transmitters

UDC: 621.391.22:621.378.325-1

USSR

AFINOGENOV, V. M., AYT KHOZHIN, S. A., STRAKHOV, V. A., TELEGIN, A. A., and TRIFONOV, V. I.

"Highly Sensitive Submillimeter Receiver Using n-GaAs"

Gor'kiy, Izvestiya VUZ--Radiofizika, No 10, 1972, pp 1572-1579.

Abstract: There is, at the present time, a demand for receivers in the short wave part of the submillimeter band with minimum inertia. Receivers using pure gallium arsenide with electron conductivity are especially promising in view of the qualities they possess, particularly the photoconductive effects of n-type GaAs. These characteristics of GaAs are investigated in the present paper for the purpose of designing this type of receiver. Subjects of the investigation were monocrystalline epitaxial films grown on substrates of semi-insulating n-GaAs, with arsenic and gallium chlorides used as the initial materials. A table of the parameters of some of the films investigated is given and other characteristics explored. The block diagram of a receiver using the epitaxial n-GaAs is proposed and analyzed. The authors thank A. N. Vystavkin, Yu. V. Gulyayev, V. F. Dvoryankin, V. V. Migulin, and A. V. Sokolov

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USSR

AFINOGENOV, V. M., et al, Izvestiya VUZ--Radiofizika, No 10, 1972,
pp 1572-1579

for their devotion to the work, V. N. Listvin for his useful com-
ments, and N. G. Yaremenko for helping investigate the film para-
meters.

2/2

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AYTKHOZHIN, S.Z.

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XIV-16. GROWTH AND DEFECT STRUCTURE OF HETEROPHASE FILMS

(Article by Yu. Sh. Tenlov, G. F. Kuznetsov, B. I. Zhilkin, S. Z. Aytkhozhin, Institute of Radiophysics and Electronics of the USSR Academy of Sciences, Moscow; Sovetskaya Fizika, 111 Zhukovskiy pr. Priborostroyeniya, 12-17 June 1972, p. 208)

The sublimation method in a hydrogen current was used to obtain CdTe films on synthetic mica -- fluorophosphate. Monocrystalline CdTe films were grown with two different temperatures of the deposition zone. It was demonstrated that in both cases there are growth configurations on the film surface. The increase in temperature of the substrate zone leads to an increase in the linear dimensions of the growth configurations and is accompanied by an increase in the surface relief. The defect structure of the heterophase CdTe films was studied by the Fujiwara method without separation of the film from the substrate. It was discovered that the dimensions and rates of disorientation of the substrate depend on the temperature of the deposition zone.

AYTKHOZHIN, S.A.

5-125 59208
C.73

XII-15. CHARACTERISTIC FEATURES OF THE GROWTH OF EPITAXIAL FILMS OF CADMIUM
SELENIDE ON SOME ALIIV COMPOUNDS
[Article by S. A. Aytkhozhin, L. G. Kvarinskaya, Moscow; Novosibirsk, III
Sovietium no. 17, 1972, p. 179]
Monocrystalline films of cadmium selenide have been grown by the gas
transport method in a hydrogen current on substrates made of semiconductor ma-
terials: gallium arsenide, gallium antimonide, indium antimonide, and gallium
phosphide.
It was demonstrated that the growth of the epitaxial films of cadmium
selenide on ALIIV takes place at lower temperatures than on dielectric sub-
strates. The minimum temperature of the epitaxial growth is 350° C.
The characteristic features of the growth of cadmium selenide films on
the (111) and (112) surface of ALIIV are discussed.

Single Crystals

USSR

UDC 548.52:539.23

AYTKHOZHIN, S. A., and TEMIROV, Yu. Sh., Institute of Radio Engineering and Electronics, Academy of Sciences USSR

"The Production of CdTe Single-Crystal Films by the Method of Condensation From the Vapor Phase in a Hydrogen Flow"

Moscow, Kristallografiya, Vol 15, No 5, Sep-Oct 70, pp 1057-1059

Abstract: The authors used the method of condensation from vapor in a hydrogen flow for the production of CdTe single-crystal films. The CdTe films were grown by the open-tube method. Substrates of synthetic mica, synthetic sapphire, gallium arsenide, and fluorite were used. The structure of the resultant films was studied by the electron diffraction method (EG-4 and EG-100 electron-diffraction cameras), as well as microscopically (MIM-8 microscope). It was found that the grown films represent the cubic phase of CdTe. The thickness of the CdTe layers varies from a few microns to several hundred, depending on the precipitation process time. It is possible to obtain single-crystal layers with a thickness of the order of 1 mm. The optimal production conditions are described.

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USSR

AYTKHOZHIN, S. A., and TEMIROV, Yu. Sh., Kristallografiya, Vol 15, No 5, Sep-Oct 70, pp 1057-1059

The authors thank Z. A. MAGOMEDOV, R. A. RABADANOV, and N. N. MAGOMEDOV for providing the sapphire substrates and for taking the electron-diffraction patterns.

2/2

- 43 -

Receivers and Transmitters

USSR

UDC: 621.391.22:621.378.525-1

AFINOGENOV, V. M., AYT KHOZHIN, S. A., STRAKHOV, V. A., TELEGIN, A. A., and TRIFONOV, V. I.

"Highly Sensitive Submillimeter Receiver Using n-GaAs"

Gor'kiy, Izvestiya VUZ--Radiofizika, No 10, 1972, pp 1572-1579 .

Abstract: There is, at the present time, a demand for receivers in the short wave part of the submillimeter band with minimum inertia. Receivers using pure gallium arsenide with electron conductivity are especially promising in view of the qualities they possess, particularly the photoconductive effects of n-type GaAs. These characteristics of GaAs are investigated in the present paper for the purpose of designing this type of receiver. Subjects of the investigation were monocrystalline epitaxial films grown on substrates of semi-insulating n-GaAs, with arsenic and gallium chlorides used as the initial materials. A table of the parameters of some of the films investigated is given and other characteristics explored. The block diagram of a receiver using the epitaxial n-GaAs is proposed and analyzed. The authors thank A. H. Vystavkin, Yu. V. Gulyayev, V. F. Dvoryankin, V. V. Migulin, and A. V. Sokolov

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USSR

AFINOGENOV, V. M., et al, Izvestiya VUZ--Radiofizika, No 10, 1972,
pp 1572-1579

for their devotion to the work, V. N. Listvin for his useful comments, and N. G. Yaremenko for helping investigate the film parameters.

2/2

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AYTKHOZHIN, S.Z.

3785 59008
6-72

XIV-16. GROWTH AND DEFECT STRUCTURE OF HETEROPHASE FILMS

Article by Yu. Sh. Teitelov, G. F. Kuznetsov, M. L. Zhurav, S. Z. Aytkhovich, Institute of Radiophysics and Electronics of the USSR Academy of Sciences, Moscow, Novosibirsk, 11. Simposium on Polymers, Acids, and Salts, Tbilisi, 1972, p. 205.

The sublimation method in a hydrogen current was used to obtain CdTe film on synthetic mica--fluorophosphate. Monocrystalline CdTe films were grown with two different temperatures of the deposition zone. It was demonstrated that in both cases there are growth configurations on the film surface. The increase in temperature of the substrate zone leads to an increase in the linear dimensions of the growth configuration, and it is accompanied by an increase in the surface relief. The defect structure of the heterophase CdTe film was studied by the Fujikawa method without separation of the film from the substrate. It was discovered that the dimensions and angles of disorientation of the substrate depend on the temperature of the deposition zone.

USSR

UDC: 577.3

AYT'YAN, S. Kh., CHIZMADZHEV, Yu. A., Institute of Electrochemistry, Academy of Sciences of the USSR, Moscow

"Formalism of Correlation Functions for Describing Neuron Networks"

Moscow, Doklady Akademii Nauk SSSR, Vol 210, No 4, 1973, pp 949-952

Abstract: A mathematical formalism is presented for describing neuron nets with regard to the correlations between neighboring neurons. Expressions are derived for the probability density functions of neurons with respect to the elapsed time since the last excitation and for the probability of neuron activity. Conditions of existence of a steady state are determined for different probability density functions.

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Biophysics

USSR

UDC 577.37

AYT'YAN, S. Kh., LEVICH, V. G., Corresponding Member, Academy of Sciences USSR, MARKIN, V. S., and CHIZMADZHEV, Yu. A., Institute of Electrochemistry, Academy of Sciences USSR, Moscow

"Generalized Model of Ion Transport Through Artificial Phospholipid Membranes"

Moscow, Doklady Akademii Nauk SSSR, Vol 193, No 6, 1970, pp 1402-1405

Abstract: A generalized model of ion transport through artificial phospholipid membranes is presented. Passage of electric current through the membrane is regarded as resulting from the direct passage of T particles, stagewise jumps of A ions, and transport of A during the action of carrier membranes. In the membrane, T and L ions can lie only on the boundary in certain potential wells, and only one ion can be present in each well (ions can enter wells only on the condition that the wells are vacant). Additionally, T and L ions may shift from wells at the left margin to the opposite well on the right boundary, provided the shift is to a vacant well.

1/1

USSR

UDC 621.315.592

ARIFOV, U. A., ABDULLAYEV, N., AYUKHANOV, A. Kh., Institute of Electronics, Academy of Sciences of the Uzbek SSR, Tashkent

"Effect of Ion Bombardment on the Photoelectric Properties of Silicon and Germanium Films Which Generate High Photovoltages"

Leningrad, Fizika i Tekhnika Poluprovodnikov, Vol 5, No 9, Sep 71, pp 1687-1690

Abstract: The authors study the effect of ion bombardment on the photoelectric properties of thin films of silicon and germanium which generate anomalously high photovoltages when exposed to light. It is found that bombardment of such films with alkali ions causes an appreciable change in photovoltage and impedance. Irradiation by ions with an energy of 50-3000 eV on a thick section reduces generated photovoltages, while irradiation on a thin section increases these voltages. At the same time, the impedance of these films decreases on all sections. When the films are bombarded by ions with energies of more than 3 keV, the generated photovoltage disappears completely on all sections at

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USSR

ARIFOV, U. A. et al., Fizika i Tekhnika Poluprovodnikov, No 9, 1971,
pp 1687-1690

relatively low radiation doses. This is accompanied by a sharp reduction in impedance. It is found that ion bombardment destroys certain volumes of the layer on the films. This destruction may be structural or may result from a change in the composition of the film due to the injection of primary ions, selective vaporization and dissociative processes.

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USSR

UDC 539.216.22:546.28+535.215

ARIFOV, U. A., ABDULLAYEV, N., and AYUKHANOV, A. Kh., Institute of Electronics Acad. of Sci. Uzbek SSR)

"Photoelectric Effect in Thin Films of Germanium and the Action of Electronic Bombardment"

Izvestiya Akademii Nauk Uzbekskoy SSR, Seriya Fiziko-Matematicheskikh Nauk (News of the Academy of Sciences Uzbek SSR, Physico-Mathematical Sciences Series), No. 5, 1970, p 41-44

Abstract: A method is described for obtaining germanium films for generating high photovoltages. The films were vacuum deposited on glass and quartz substrates. The evaporation vessels were heated to 1100-1200°C. The films, 0.1 to 0.3 micron thick, were cooled to 20°C in vacuum, fitted with silver or a quadrag contacts, and tested at both room temperature and liquid nitrogen temperature. The photovoltage generated in the germanium films was independent of the substrates and was always larger in air than in vacuum at room temperature, but at liquid nitrogen temperature it can be larger or smaller. Polarity remained constant at all temperatures, in air and vacuum, and with direct illumination or illumination through the substrate. The maximum voltage of 410 v/cm at room temperature and 1100 v/cm at liquid nitrogen temperature was obtained with an $1/2$

USSR

ARIFOV, U. A., et al, Izvestiya Akademii Nauk Uzbekskoy SSR, Seriya Fiziko-Matematicheskikh Nauk, No 5, 1970, p 41-44

illumination of 3×10^5 lux. Dark resistance is between 10^{11} and 10^{13} ohms. Electron bombardment of films affected their voltage characteristics. The voltage decreases sharply at first, then gradually. With beams of 1.5 to 2 kev photovoltage disappears and resistance decreases. Apparently, electron irradiation dissociates oxide inclusions in the material, and photovoltage entirely disappears when this dissociation is complete. Exposure of the films to air restores the photovoltage when the dissociated inclusions are stabilized. Orig. art, has 2 figs., 2 tables, and 11 refs.

2/2

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USSR

UDC: 539.216.22:546.28+535.215

ABDULLAYEV, N., AYUKHANOV, A. Kh., ARIFOV, U. A., Institute of Electronics of the Academy of Sciences of the Uzbek SSR

"Influence of Electron Bombardment on the Anomalous Photovoltage Effect in Germanium and Silicon Films"

Tashkent, Izvestiya Akademii Nauk UzSSR, Seriya Fiziko-Matematicheskikh Nauk, No 2, 1973, pp 34-36

Abstract: The authors study the effect of electron bombardment on the photoelectric characteristics of semiconductor films which generate anomalously high photovoltages. The primary electron energy was up to 10 keV with a beam density of $1 \mu\text{A}/\text{cm}^2$. The bombardment was done and the measurements were made in a vacuum of 10^{-6} mm Hg. The change in the generated photovoltage V and resistance R was measured separately in each of five sections of 2 mm length on the specimens. It was found that electron bombardment decreases V considerably for critical energies of up to about 2 keV for silicon films, and up to about 100 eV for germanium. The recovery time for V increases with electron energy and radiation dose. There was no appreciable reduction in R for the given energy range at

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ABDULLAYEV, N. et al., Izvestiya Akademii Nauk UzSSR, Seriya Fiziko-Matematicheskikh Nauk, No 2, 1973, pp 34-36

doses of up to 10^4 $\mu\text{cb}/\text{cm}^2$. When the primary electron energy is increased past 2 kev for silicon and 100 ev for germanium, V decreases even more, there is a noticeable reduction in R, and V and R do not recover their initial values in a vacuum. When the films are held in air, there is a gradual increase in V and R. At primary electron energies of more than 5 kev for silicon and 500 ev for germanium, V disappears and R is reduced by 2-3 orders of magnitude. A physical interpretation is given for the mechanism responsible for the observed effects.

2/2

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1/2 024 UNCLASSIFIED PROCESSING DATE--30OCT70
TITLE--ANOMALOUSLY HIGH PHOTOVOLTAGE IN SILICON FILMS AT LIQUID NITROGEN
TEMPERATURE -U-
AUTHOR--(03)-ARIFOV, U.A., ABDULLAYEV, N., AYUKHANOV, A.KH. *A*
COUNTRY OF INFO--USSR
SOURCE--IZV. AKAD. NAUK UZB. SSSR, SER. FIZ.-MAT. NAUK 1970, 14(1), 43-4
DATE PUBLISHED--70

SUBJECT AREAS--PHYSICS, MATERIALS
TOPIC TAGS--PHOTO EMF, SILICON FILM, LIQUID NITROGEN, VOLT AMPERE
CHARACTERISTIC

CONTROL MARKING--NO RESTRICTIONS
DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/1141 STEP NO--UR/0166/70/014/001/0043/0044
CIRC ACCESSION NO--AP0124796
UNCLASSIFIED

2/2 024

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0124796

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PHOTOVOLTAGES GENERATED IN 6 SI FILMS ON GLASS AND QUARTZ SUBSTRATES WERE MEASURED AT MINUS 196 DEGREES IN A VACUUM OF 10 PRIME NEGATIVES TORR AND UNDER ILLUMINATION WITH 3 TIMES 10 PRIME NEGATIVES LX. THE PHOTOVOLTAGES V, V PRIME, V SUB2, AND V PRIME SUB2 UNDER ILLUMINATION FROM ABOVE AND FROM THE SUBSTRATE SIDE, AT ROOM TEMP. AND AT MINUS 196 DEGREES, RESP., TOGETHER WITH THE RESP. SHORT CIRCUIT CURRENTS, I, I PRIME, I SUB2, AND I PRIME SUB2, ARE TABULATED. FOR THE 6 SAMPLES, VOLTAGES SMALLER THAN OR EQUAL TO 2400 V AND CURRENTS SMALLER THAN OR EQUAL TO 1.2 TIMES 10 PRIME NEGATIVE 10 A WERE OBTAINED. A PLOT IS SHOWN FOR THE DEPENDENCE OF PHOTOVOLTAGE AND CURRENT ON INTEGRAL ILLUMINATION. FACILITY: INST. ELEKTRON., TASHKENT, USSR.

UNCLASSIFIED

USSR

UDC 621.373.826:550.3

AYUREANAYN, A. A, BORONOVYEV, V. V., and ZUBRITSKIY, E. V.

"Experimental Investigation of the Dispersion of Intensity Fluctuations in Laser Radiation Under the Condition of Inclined Range Length"

Moscow, V sb. X Vses. konf. po rasprostr. radiovoln. Tezisy dokl. (Tenth All-Union Conference on the Propagation of Radio Waves; Report Theses--collection of works) "Nauka," 1972, pp 211-215 (from RZh--Radiotekhnika, No 10, 1972, Abstract No 10D443)

Translation: Results are given of measurements of the dependence of experimental dispersion values of the fluctuation in the light intensity logarithm σ_e on the dispersion value σ computed for a given inclination of the range. The region of maximum values of σ_e lies in the limits of $\sigma_1 = 1-3$, and saturation is reached at $\sigma_e \approx 1.2$. Two illustrations, bibliography of four. A. L.

1/1

USSR

ENC 538.65

A
~~AYMEZANAYN~~ B. A., and KHRUMOV, B. P., Krasnoyarsk Institute of Non Ferrous Metals Imeni M. I. Kalinin

"Magnetostriction Paraprocess and Its Dependence on the Temperature of Elinvar Alloys in the Iron-Nickel-Chromium System"

Sverdlovsk, Fizika Metallov i Metallovedeniye, Vol 30, No 3, Sep 70, pp 577-581

Abstract: The magnetostriction paraprocess and its dependence on temperature for Elinvar alloys was studied in strong magnetic fields. A definite relationship was determined between the magnetostriction susceptibility of the paraprocess and the lattice parameters. It was demonstrated that the form of the curves of the temperature dependence of magnetostriction depends on the relationship between linear and volumetric magnetostriction. Elinvars which have both magnetostriction of technical magnetization and the paraprocess have technical applications.

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USSR

UDC 669.71.472(088.8)

BELOV, Yu. I., VOROB'YEV, D. N., SOBOL', I. I., AYUSHIN, B. I., and
ZYRYANOV, L. P.

"Method of Utilizing the Spent Carbon-Material Lining of Aluminum Electro-
lyzers"

USSR Author's Certificate No 261701, Filed 30/10/68, Published 28/08/70
(Translated from Referativnyy Zhurnal-Metallurgiya, No 2, 1971, Abstract
No 2 G158 P)

Translation: To reduce the cost of production of Al, the used lining made
of carbon materials is ground to a grain size of 0.2 mm, then used to make
up 2-5% of the dry charge used to make the anode mass.

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- 4 -

1/2 031 UNCLASSIFIED PROCESSING DATE--04DEC70
TITLE--PRESSURE AND COMPOSITION OF GASES IN ANODES OF ALUMINUM
ELECTROLYTIC CELLS WITH TOP CURRENT FEED -U-
AUTHOR-(02)-KOROBV, M.A., AYUSHIN, B.I.

COUNTRY OF INFO--USSR

SOURCE--TSVET. METAL. 1970, 43(5), 47-9

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR, ELECTRONICS
AND ELECTRICAL ENGR.

TOPIC TAGS--PHYSICAL CHEMISTRY PROPERTY, ELECTROLYTE, ANODE MATERIAL, GAS
ANALYSIS, PHYSICAL DIFFUSION, ALUMINUM, ELECTROLYTIC CELL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--3008/0327

STEP NO--UR/0136/70/043/005/0047/0049

CIRC ACCESSION NO--AP0137432

UNCLASSIFIED

2/2 031

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0137432

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PURPOSE OF THE STUDY WAS TO DET. THE FORMATION CONDITIONS OF A SELFBAKING ANODE AND THE PHYS. CHEM. PROCESSES TAKING PLACE DURING THIS FORMATION. LAB. SCALE EXPTS. WERE CARRIED OUT DURING WHICH GAS ANAL. FOR CO, CO SUB2, O, C SUBM H SUBN, H, AND C SUBN H SUB2N PLUS 2 WAS MADE AND GAS PRESSURES WERE DETD. AT VARIOUS LEVELS AND DEPTHS. THE GAS PRESSURE DECREASED FROM THE CENTER OF THE ANODE TOWARD THE PERIPHERY. THE MAX. GAS PRODUCTION RATE WAS AT 390-450DEGREES, AND THE FORMATION OF TAR HYDROCARBONS WAS FINISHED AT SIMILAR TO 500DEGREES. THE MAX. GAS PERMEABILITY WAS AT 390-480DEGREES. CONSIDERABLE AMTS. OF CO PLUS CO SUB2 (30-80PERCENT) WERE DETD. ALONG THE WHOLE LENGTH OF THE ANODE, AND THEIR HIGHEST CONC. WAS AT THE BOTTOM. UNDER INDUSTRIAL CONDITIONS, THE GAS COMP. ON THE ANODE WAS QUITE DIFFERENT FROM THE COMP. IN LAB. SCALE EXPTS. TO IMPROVE THE QUALITY OF THE ANODE AND REDUCE ITS CONSUMPTION, LOW LEVELS OF ELECTROLYTES (12-15 CM) SHOULD BE USED.

UNCLASSIFIED

Physical Properties

USSR

UDC 669.715'25-537

LEVIN, Ye. S., GEL'D, P. V., and AYUSHINA, G. D., Ural Polytechnic Institute, Chair of Physics,

"Electric Resistance of Liquid Alloys of Cobalt With Aluminum"

Ordzhonikidze, Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, No 5, 1972, pp 111-115

Abstract: The temperature-concentration dependences of the specific electric resistance of liquid alloys of cobalt with aluminum were experimentally investigated on specimens prepared from AV000 aluminum (99.98 %Al) and electrolytic cobalt containing less than 0.04% impurities. The investigation results are discussed by reference to diagrams showing the temperature dependence of the electroconductivity δ and the specific electric resistance ρ of aluminum, the polytherms, and the isotherm (1650°C) of ρ of liquid Al-Co alloys. The isotherm has an extreme character approximately in accordance with the equiatomic alloy. All alloys showed a notable increase of ρ when melting. A negative temperature coefficient of electric resistance was observed on liquid Al-rich alloys (81.9 and 76.5 at% Al). Alloys with high Co-content showed typical properties of metals. The peculiarities of electroconductivity of Al-Co melts are explained by the energetic non-equivalence of different interparticle actions. Three figures, three formulas, eleven bibliographic references.

Physical Properties

USSR

UDC: 669.15'71'26

LEVIN, Ye. S., and AYUSHINA, G. D., Sverdlovsk

"Viscosity and Electroconductivity of Al-Fe-Cr Melts"

Moscow, Izvestiya Akademii Nauk SSSR, Metally, no 6, Nov-Dec 70, pp 52-57

Abstract: The physical properties of Fe-Cr-Al melts have never been a subject of a systematic study though it is of interest to know the characteristics of particle interaction and their internal structure. The experimental specimens were prepared from carbonyl iron of V-3 quality (99.988% Fe), doubly refined electrolytic chromium, and AV-000-grade aluminum (99.999% Al). This study deals with the temperature and concentration dependences of the kinematic viscosity (ν) of Al-Fe-Cr melts. The dependence of ν on composition does not adhere to the law of additivity. In melts containing 20% aluminum, as the iron-to-chromium concentration ratio (β) is increased, viscosity monotonically increases. In melts with $\beta=1$, as the aluminum content is increased from 15 to 65%, kinematic viscosity decreases at 1650°C from 0.00000058 to 0.00000039 m²/sec. A melt with 5%

USSR

LEVIN, Ye. S., and AYUSHINA, G. D., Izvestiya Akademii Nauk SSSR, Metally, No 6, Nov-Dec 70, pp 52-57

aluminum displays much lower viscosity values (less than $0.0000004 \text{ m}^2/\text{sec}$ at temperatures above 1500°C). The electroconductivity was studied over a wide range of temperatures and compositions and was found to depend on both temperature and composition. The properties of Al-Fe-Cr melts are well apart from those of ideal alloys. It is suggested that quasi-molecular complexes of microinhomogeneous structure may form in the alloys.

Physical Properties

USSR

UDC 669.245.715-154

LEVIN, YE. S., and AYUSHINA, G. D., Sverdlovsk

"Study of Certain Physical-Chemical Properties of Ni-Al Melts"

Moscow, Izvestiya Akademii Nauk SSSR, Metally, No 1, Jan 71,
pp 227-229

Abstract: The concentration dependence of viscosity, gram-atom volumes, and surface energy of liquid nickel aluminides was studied. It was confirmed that these alloys fall in the category of solutions with strongly interacting particles. It was demonstrated that the specifics of the structure-sensitive characteristics of liquid Ni-Al alloys are related to the formation of microgroups of near equiatomic concentration.

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USSR

UDC 669.715.24

LEVIN, Ye. S., ANDUSHINA, G. D., and SEL'D, P. V., Sverdlovsk

"Viscosity of Ni-Al Melts"

Moscow, Izvestiya Akademii Nauk SSSR, Metally, No 4, Jul-Aug 70, pp 49-55

Abstract: Temperature and concentration characteristics of the kinematic viscosity of Ni-Al melts were investigated on a series of samples of pure Al and pure Ni by the oscillating-torsion method on the basis of the logarithmic damping decrement. The accuracy of the calculated viscosity from the formula for mildly viscous liquids was $\pm 5\%$. In order to explain the characteristics of interparticle correlations in Ni-Al melts, the effect of their chemical compositions on the viscosity at constant temperature was investigated. The investigation results are discussed by reference to diagrams. It is shown that the concentration dependencies of the viscosity and the variation of the isobar-isothermal potential of the viscous flow process do not comply with the additivity rule. The viscosity characteristics, the densities, and the surface energies of the investigated Ni-Al alloys are explained by the formation of thermal stable microgroups. The composition and structure of these groups define the physico-chemical properties of the fusions.

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USSR

UDC 620.193.01:669.295

TOMASHOV, N. D., RUSKOL, YU. S., AYUYAN, G. A., IVANOV, YU. M., PLAVNIK, G. M., and NAZAROVA, R. I., Academy of Sciences USSR, Institute of Physical Chemistry

"The Effect of Alloying Elements on the Corrosion Behavior of Titanium"

Moscow, Zashchita Metallov, Vol 9, No 1, Jan-Feb 73, pp 10-15

Abstract: The method of potentiostatic polarization curves, corrosion tests, and electron diffraction investigations were applied to investigate the corrosion and electrochemical properties of alloys based on titanium iodide with small additions of chromium, molybdenum, niobium, aluminum, manganese, and tin in a 40% H_2SO_4 solution at 80° under natural aeration, conditions.

The structure of the anodic oxide films developing on these alloys was analyzed. The passivation and full passivation potentials were found to be practically independent of the nature and concentration of the alloying addition, whereas the critical passivation currents and the currents in the passive zone varied significantly. Aluminum impairs the corrosion properties of titanium both in the active and passive states. Manganese and chromium increase the rate of corrosion in the active state and decrease it in the passive state. Niobium, on the other hand, reduces titanium corrosion rate in the active state and increases it in the passive state. One figure, three tables, thirteen bibliographic references.

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USSR

UDC 535,343-15:546.822'21+546.882'21

AYVASOV, M. I., and MURANEVICH, A. KH., Institute of New Chemical Problems,
Academy of Sciences USSR

"Nature of the Interatomic Interaction in the Homogeneous Region of Titanium
and Vanadium Oxides"

Moscow, Neorganicheskiye Materialy, Vol 9, No 12, 1973, pp 2156-2158

Abstract: The IR absorption spectra of the variable composition of oxides TiO_{1+x} and VO_{1+x} , from $TiO_{0.83}$ to $TiO_{1.30}$ and from $VO_{0.79}$ to $VO_{1.29}$, are shown. The stable position of the valence band vibration for M-O in these oxides indicates that the strength of the bands is practically the same in each atom. The more rapid attenuation of the TiO_{1+x} vibration band relative to that of VO_{1+x} during an increase in x is related to the decrease in the degree of polarization of the M-O bond in TiO_{1+x} . The smaller overlap of the d-orbitals of the metal in VO_{1+x} relative to TiO_{1+x} causes a large number of valence electrons to be near the value of electronic component of the heat transfer. In VO_{1+x} structures having excess oxygen, an increase in the $1/2$

USSR

AYVAZOV, M. I., and MURANEVICH, A. KH., Neorganicheskiye Materialy, Vol 9, No 12, 1973, pp 2156-2158

Ionization of the M-O bond somewhat decreases the network component of the heat transfer.

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- 83 -

USSR

UDC 612.821

AYVAZASHVILI, I. M., IORDANISHVILI, G. S. and CHIKVAIDZE, V. N., Institute of Physiology, Academy of Sciences, Georgian SSR, Tbilisi

"On the Role of Biogenic Amines in the Mechanism of Memory"

Moscow, Doklady Akademii Nauk SSSR, Vol 212, No 6, 1973, pp 1479-1481

Abstract: The influence of phelazine on the psychonervous and conditioned-reflex memory of rats was investigated. Psychonervous memory was correlated with retention of associations between a dark chamber and pain, while conditioned-reflex memory used associations between sound and pain. It was observed that phelazine introduced before reaction formation greatly reduced psychonervous memory, particularly if administered for three days before, while if given after formation it had no effect. Conditioned-reflex memory was unchanged. These results are said to be due to the inhibition of mono-amine oxidases and the accumulation of serotonin. This is confirmed by the observation that parachlorophenylalanine administration somewhat improves memory. The experiments are considered to show the different chemical natures of psychonervous and conditioned-reflex memories and the special role of serotonin in psychonervous memory.

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1/2 042 UNCLASSIFIED PROCESSING DATE--02OCT70
TITLE--MODELING OF THE DYNAMIC MECHANICAL PROPERTIES OF TWO COMPONENT
HETEROGENEOUS POLYMER COMPOSITIONS BY THE TECHNIQUE OF COMPOSITE
AUTHOR--(03)--AYVAZOV, A.B., ZELENEV, YU.V., BARTENEV, G.M.

COUNTRY OF INFO--USSR

SOURCE--MEKH. POLIM. 1969, 5(6), 1119-22

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ELASTIC MODULUS, PLASTIC MECHANICAL PROPERTY, SYNTHETIC
RUBBER, POLYSTYRENE RESIN, POLYMER BINDER, COMPOSITE MATERIAL,
MATHEMATIC MODEL

CONTROL MARKING--NO RESTRICTIONS

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ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE COMPLEX DYNAMIC ELASTICITY MODULUS (E) AND TAN (MECH. LOSS ANGLE) (TAN DELTA) WERE DETD. IN THE MINUS 100 TO PLUS 100DEGREES RANGE FOR MIXTS. OF SYNTHETIC RUBBERS WITH POLYSTYRENE (I). ALSO E AND TAN DELTA WERE DETD. OF COMPOSITE SAMPLES CONSISTING OF PURE I BONDED TO PURE RUBBER. FORMULAS WERE REDUCED WHICH GIVE THE REAL (E SUB1) AND IMAGINARY (E SUB2, LESS MODULUS) COMPONENTS OF 3 IN TERMS OF E SUB1 AND E SUB2 OF THE MIXT. CONSTITUENTS. THERE IS A CLOSE CORRESPONDENCE BETWEEN THESE FORMULAS AND FORMULAS DEDJED FOR THE MIXTS., WHICH SHOWS THAT THESE MIXTS. ARE HETEROGENEOUS AND THEREFORE THEIR MECH. DYNAMIC PROPERTIES ARE MATH. PREDICTABLE WHEN THEIR COMPN. IS KNOWN.

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USSR

UDC 621.3.023.669.295

TROITSKIY, V. N., GREBTSOV, B. M., and AYVAZOV, M. I., Institute of New Problems in Chemistry of the Academy of Sciences USSR

"The Production of Titanium Boronitride Powders in the Plasma of SHF (Super High Frequency) Discharge"

Kiev, Poroshkovaya Metallurgiya, No 11(131), Nov 73, pp 6-9

Abstract: A study was made of the possibility of producing alloys in the Ti-B-N system during a very short duration ($\sim 10^{-2}$ sec) of stay of the reacting mixture in the plasma-chemical reactor. For this purpose a previously described (Ibid.: No 3, 1972) installation was used in which a joint reduction of titanium and boron chlorides was realized in nitrogen plasma generated by continuous SHF discharge of 15 kw power. The analysis of the temperature dependence of the electroconductivity of boronitrides shows that a dissolution of 16 wt % boron in titanium nitride results in a diminution of the temperature coefficient of the electric resistance of boronitrides by 2.5 times, when compared to pure titanium nitride. Two figures, one table, six bibliographic references.

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USSR

UDC 546.763'171.1:538.22

AYVAZOV, M. I., DOMASHNEV, I. A., GUROV, S. V., and REZCHIKOVA, T. V.,
Institute of New Chemical Problems, Academy of Sciences USSR

"Electrophysical and Magnetic Properties of Chromium Nitride"

Moscow, Neorganicheskiye Materialy, Vol 9, No 4, Apr 73, pp 600-603

Abstract: The electric conductivity, thermal emf, Hall effect, magnetic resistance, and magnetic susceptibility of CrN over a wide temperature interval were investigated. It was found that CrN is a more ionic compound than nitrides of titanium and vanadium. Amplification of the ionicity percentage in M-X interactions leads to realization of the system of spin-polarization electron states. A phase transition was observed at 290°K to CrN_{0.98} which was associated with the trigonal distortion of the crystal lattice. 3 figures, 10 bibliographic references.

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USSR

UDC 621.3.023:669.295

TROITSKIY, V. N., AYVAZOV, M. I., KUZNETSOV, V. M., and KORYAGIN, V. S.,
Institute for New Chemical, Academy of Sciences USSR

Application of Superhigh-Frequency Discharge to Obtain Titanium Nitride Powder"

Kiev, Poroshkovaya metallurgiya, No 3, 1972, pp 8-11

Abstract: A description is given of the equipment and the procedure for producing titanium nitride by hydrogen reduction of titanium tetrachloride in a nitrogen current heated in superhigh-frequency heater, reactor, and bubble-type chloride feeder. The overall conversion efficiency of $TiCl_4$ is as high as 100%. Ammonium chloride is the by-product. The powder obtained is 98% nitride and is close in composition to $TiN_{0.95}$ with a pycnometric density of 5.11 g/cm^3 . It is finely dispersed and can be sintered at lower temperatures. Experimental sinters of the new powder at $1200-1300^\circ\text{C}$ and low pressures yielded high-strength specimens with 3-5% porosity. It is also readily compactable (three illustrations, 4 bibliographic references).

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USSR

UDC 546.822*712-31.538.214

AYVAZOV, H. I., GUROV, S. V., and SARKISYAN, A. G.

"Magnetic Properties of Materials Based on TiO-MnO"

Moscow, Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materialy, Vol 8,
No 5, 1972, pp 853-857

Abstract: The magnetic susceptibility of alloys in the TiO-MnO cross section is studied in the 100-1000° K temperature interval. In alloys on the MnO side, as the content of TiO is increased, the degree of antiferromagnetic interaction decreases and super exchange interaction of ferromagnetic type appears. In alloys on the TiO side, the introduction of MnO results in the appearance of antiferromagnetic pairing of electrons and a decrease in the contribution of the spin paramagnetism of quasicoupled electrons.

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USSR

UDC 546.824'171.1:541.67

AYVAZOV, M. I., DOMASHNEV, I. A. and KIREYEVA, I. M., Institute for New Problems, Academy of Sciences USSR

"Electric Properties of $\text{TiN}_{0.96}$, $\text{TiB}_{0.43}\text{N}_{0.78}$ and $\text{TiSi}_{0.51}\text{N}_{0.42}$ "

Moscow, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 7, No 10, Oct 71, pp 1739-1742

Abstract: The study of the electric conductivity, thermal emf, and Hall effect of isostructural compounds (NaCl-type structure) of $\text{Ti}_{0.96}$ and $\text{TiB}_{0.43}\text{N}_{0.78}$ over a wide temperature range has shown the need of an energy scheme of overlapping zones to explain the charge transfer process in the carriers. Substituting boron for nitrogen reduces the degree of fullness. The electrophysical properties of $\text{TiSi}_{0.51}\text{N}_{0.42}$ compounds (NaCl-type structure) at high temperatures may be ascribed as semiconductor-type compounds with a forbidden zone width of 0.4 eV. The conductivity, thermal emf, and Hall effect were studied on hot-formed specimens with 5-8% porosity. The former two properties were measured within 300-1600°K, while the Hall effect -- within 300-1000°K. Temperature-property relationships are

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AYVAZOV, M. I., et al, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 7, No 10, Oct 71, pp 1739-1742

presented in curves. The source products for the study were TiCl_4 , BCl_3 , SiHCl_3 , H_2 , and especially pure N_2 . (2 illustrations, 1 table, 9 bibliographic references).

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USSR

UDC. 546.821

AYVAZOV, M. I. and DOMASHNEV, I. A., Institute for New Chemical Problems,
Academy of Sciences USSR

"Electrophysical Properties of Titanium Diboride and Alloys in the Ti-B-N
System"

Moscow, Izvestiya Akademii nauk SSSR, Neorganicheskiye materialy, Vol 7,
No 10, Oct 71, pp 1735-1738

Abstract: Described is a study of the electrophysical properties of titanium diboride and alloys in the Ti-B-N system. The properties included electric conductivity, thermal emf, and Hall effect over a wide temperature range. It is shown that compositions from the TiB_2 homogeneity region and Ti-B-N alloys with an AlB_2 structure contain zones with various degrees of fullness. The electrophysical properties of these compositions may be adequately explained using the model of overlapping zones. The compositions from the TiB_2 homogeneity region and alloys of the Ti-B-N system were obtained by crystallization from the gas phase. The conductivity and thermal emf were studied within 300-1500°K; the Hall effect -- within 300-1100°K. The temperature relationships of these properties are presented in curves. (6 illustrations, 1 table).

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USSR

UDC 546'821'27'17:538.214

AYVAZOV, M. I., GUROV, S. V., DOMASHNEV, I. A., and
KIREYEVA, I. M., Institute of New Chemical Problems of the
Academy of Sciences USSR

"Investigation of Magnetic Properties of Variable Composition
Phases of Titanium Nitride, Titanium Diboride, and Alloys in
the Ti — B — N System"

Moscow, Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materi-
aly, Vol 7, No 7, Jul 71, pp 1176 — 1179

Abstract : The magnetic susceptibility of alloys in the system
Ti — B — N and of the variable composition phase $TiB_{2 \pm x}$ were in-
vestigated in the temperature interval of 100—1300 °K. Demon-
strated investigation results of the temperature dependence of
the magnetic susceptibility show that the latter is characteri-
zed by temperature-independent high values of the susceptibility
in the region of low temperatures. The susceptibility of two com-
positions TiN_{1-x} probably can be expressed by $\chi = \chi_d + \chi_c + \chi_e$,
where χ_d =diamagnetism of the ionic hull, χ_c = Curie susceptibili-

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AYVAZOV, M. I., et al., Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materialy, Vol 7, No 7, Jul 71, pp 1176-1179

ty, and χ_e = electron paramagnetism. The initial concentration of charge carriers (p-type) is on all TiB_2 -compositions of the order 10^{21} cm^{-3} . The magnetic susceptibilities of TiN and T - B - N compositions show a notable effect of the crystalline lattice on the formation of "quasi-localized" electron conditions. The presence of a partially filled up 2p-zone effects an increased Pauli paramagnetism on TiB_2 -compositions at low temperatures and the appearance of two kinds of carriers at high temperatures. Four illustr., one table, eight biblio. refs.

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USSR

UDC 546.171.1

AYVAZOV, M. L., SARKISYAN, A. G., DOMASHNEV, I. A., GUROV, S. V., Institute of New Chemical Problems, Academy of Sciences USSR

"Synthesis and Study of Alloys in the TiO-MnO Cross Section"

Moscow, Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materialy, No 7, 1972, pp 1218-1220

Abstract: In certain trinary phases, a deviation is observed from the ordinary A_2B formula. The deviation from stoichiometry is most significant when component B is chrome or manganese. In this case, the stoichiometric composition shifts from A_2 to B to AB. The literature contains no data on the nature of formation of phases in the cross section TiO-MnO. Study of this section is of both theoretical and practical interest, since as the 3d shell is filled, the electro-physical properties of monoxides shift from metal-like to dielectric. TiO-MnO specimens were prepared each 10 wt. % throughout the entire concentration interval and studied. MnO dissolves in TiO up to 15 wt. %, TiO in MnO--up to 40 wt. %. The alloys have an NaCl-like structure. The single-phase area in the TiO-MnO cross section can be considered a solid solution of substitution.

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USSR

UDC 536.421.4+536.421.1

AYVAZOV, V. Ya.

"Characteristics of Fine SiO₂ Films Obtained by Electron-Beam Vaporization"

Poluprovodn. tekhn. i mikroelektronika. Resp. mezhved. sb. (Semiconductor Engineering and Microelectronics, Republic Interdepartmental Collection -- collection of works) 1971, No 5, pp 59-65 (from RZh-Fizika, No 9, 1971, Abstract No 9E398)

Translation: The effect of technical factors on the characteristics of SiO₂ films obtained by electron-beam vaporization is demonstrated by investigating the optical absorption in the wavelength range of 0.2-12 μ and by the measurement of the dependence of the dielectric characteristics on temperature and frequency. Films coated at a rate of 10 Å/s on a substrate having a temperature above 400°C have the best characteristics.

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USSR

UDC 621.315.592:546:539.238

AYVAZOV, V. YA.

"Properties of Thin SiO_2 Films Obtained by the Method of Cathode-Ray Evaporation"

Kiev, Poluprovodnikovaya tekhnika i mikroelektronika, No 5, 1971, pp 59-64

Abstract: A study was made of the effect of technological factors on the composition, structure and dielectric properties of films obtained by the evaporation of quartz by an electron beam. The optical absorption in the wavelength range of 0.2-12 microns and the temperature and frequency dependencies of the dielectric properties were measured. Films deposited at a rate of 10 \AA/sec at a substrate temperature above 400°C have the best properties. The mechanism of this effect is discussed. The SiO_2 films obtained by the described procedure are characterized by the following parameters: $\epsilon = 4.0 \pm 0.2$; $\text{tg } \delta \approx 0.01$; specific resistance $10^{14}-10^{15} \text{ ohm-cm}$; breakdown intensity of the electric field (3-5) 10^6 volts/cm . During cathode-ray evaporation of SiO_2 , the composition of the deposited films depends basically on the power of the electron beam, and their porosity, on the substrate temperature during deposition and the substrate material.

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